

necessary for the assimilation of carbon—the presence of chlorophyll, the existence of living protoplasm in contact with the chlorophyll, and light rays. The results of the experiments described in the present paper would appear to show that the second condition is not essential. A glycerine extract of the leaves, filtered first through paper and then through a Chamberland porcelain filter, and containing no trace of cells or even of protoplasmic debris, shows no assimilation in either light or darkness. The leaves of the same species dried at 100° C. gave a green powder containing no living matter, an extract also showing no assimilating power in the light. But a mixture of these two extracts exposed to the light readily absorbed carbon dioxide and gave off oxygen. From these experiments the author concludes that chlorophyll assimilation is accomplished without the intervention of living matter by a diastase which utilises the energy of the sun's rays, the chlorophyll acting as a sensitiser.

THE additions to the Zoological Society's Gardens during the past week include a Red Howler (*Myiotes seniculus*) from Colombia, presented by Commander A. Jolliffe; an Arctic Fox (*Canis lagopus*) from the Arctic Regions, presented by Dr. H. A. Allbutt; a Black-faced Kangaroo (*Macropus melanops*, ♀) from Tasmania, presented by Miss Amy Mitchell; two Barred Doves (*Geopelia striata*) from India, presented by Mr. W. A. D. Harding; an Allen's Porphyrio (*Hydrornia alleni*), captured at sea, presented by Miss V. I. Nielsen; a Rook (*Corvus frugilegus*), British, presented by Mr. A. Yates; a Spider Monkey (*Ateles*, sp. inc.), a Kinkajou (*Cercoleptes caudivolvulus*), a Feline Douroucoulis (*Nyctipithecus vociferans*), a Corais Snake (*Coluber corais*) from South America, a Vulpine Phalanger (*Trichosurus vulpecula*), a Short-tailed Wallaby (*Macropus brachyurus*), two Quoy's Lizards (*Lygosoma quoyi*) from Australia, an — Ibex (*Capra*, sp. inc.) from Persia, two Simony's Lizards (*Lacerta simonyi*) from the Canaries, six Tigrine Frogs (*Rana tigrina*) from the East Indies, three Schlagintweit's Frogs (*Rana cyanophlyctis*) from Southern Asia, five — Skinks (*Eumeces skiltonensis*), four Changeable Tree Frogs (*Hyla versicolor*) from North America, a Californian Toad (*Bufo boreas*) from California, two Hamilton's Terrapins (*Damonion hamiltoni*), four Bungoma River Turtle (*Emyda granosa*) from India, deposited; two Common Teal (*Querquedula crecca*), a Shag (*Phalacrocorax graculus*), European, purchased; a Japanese Deer (*Cervus sika*, ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

NEW VARIABLE STAR 71 (1901) AURIGÆ.—Mr. Stanley Williams announces in the *Astronomische Nachrichten*, Bd. 155, No. 3708, the discovery of variability in the star B.D. +42° 1295, the position of which is

$$\left. \begin{array}{l} \text{R.A.} = 5^{\text{h}}. 18^{\text{m}}. 19^{\text{s}}.55 \\ \text{Decl.} = +42^{\circ} 18'5 \end{array} \right\} (1855^{\circ}).$$

The magnitude variations have been measured from photographs taken with a portrait lens of 4.4 inches aperture, and the following are the elements deduced:—

Period, 0.7925d. = 19h. 1m. 12s.
Epoch max. 1901 March 3 (2415447), 13h. om. G.M.T.
Limits of variation, 8.75 mag. to 9.65 mag.
Max. to min., 14h. 13m.
Min. to max., 4h. 48m.
Ratio of increase to decrease = 0.34.

SPECTRUM OF ζ PUPPIS.—In *Harvard College Observatory Circular*, No. 55, Prof. E. C. Pickering gives the results of a new investigation by Mr. King of the spectrum of ζ Puppis with relation to the new lines of hydrogen found in that star some time ago. The lines occur also in δ and ε Orionis and the spectra of

these stars have consequently been used in the reduction. The first line of the series corresponding to the red ordinary line has not yet been recorded, and the observed series consists of seven lines whose measured wave-lengths were 5413.6, 4542.4, 4200.7, 4026.0, 3924.0, 3860.8, 3815.7.

DEFINITIVE ORBIT OF COMET 1894 II. (GALE).—In the *Astronomical Journal* (vol. xxi. Nos. 496-7), Mr. H. A. Peck brings together all the available published observations of this comet from April to July 1894, and from their discussion computes the definitive elements referred to the mean equinox and ecliptic of 1894.0, which are the following:—

$$\begin{aligned} T &= 1894 \text{ April } 13^{\text{d}} 406912 + 0^{\circ}000395\delta\nu \\ \omega &= 324^{\circ} 12' 22''.52 + 1^{\circ}2046\delta\nu \\ \Omega &= 206^{\circ} 23' 53''.04 - 0^{\circ}5347\delta\nu \\ i &= 86^{\circ} 59' 18''.19 + 0^{\circ}8478\delta\nu \\ q &= 0.9830931 + 0^{\circ}00001339\delta\nu \\ e &= 0.9911206 + 0^{\circ}00002837\delta\nu \end{aligned}$$

δν will most probably have some value between -20" and -60". For δν = 40" the period of revolution would be 1143 years. The orbit of this comet appears to indicate peculiar relations to that of Jupiter. During the entire period of visibility, and for two or three years previous, the planet was near the orbit plane. A computation of the perturbations due to the major planets is now in progress.

THE UNIVERSITY OF LONDON.

THE presentation of prizes and degrees at the University of London on Wednesday, May 15, was the occasion of some noteworthy remarks upon the work and promise of the University. We give the Vice-Chancellor's address, together with parts of subsequent speeches.

Sir Henry Roscoe said,—“The past year has been one of loss and sorrow not only to the whole nation but also to this University. It has, however, I hope, been a year of some achievement. The death of her late Majesty, Queen Victoria, deprived us not only of our visitor but also of our foundress, and it is no small matter to have such a name to look back upon. For, although the earliest charter of the University bears date 1836, and was amongst the last of those issued by King William IV., yet no real start had been made in the work of the University previous to the accession of the Queen, and at the commencement of her reign she showed her interest by formally renewing the first charter of the University. This early interest never declined and, in 1870, when, after long delay, the University was granted by the Government a home of its own in Burlington-gardens, it was the Queen who personally opened the building on the presentation day of that year.

“The senate and graduates of the University presented a respectful address of condolence and congratulation to His Majesty, King Edward VII., on his accession, and the King in his gracious reply, which I will venture to read to you, was pleased to express his own continued interest in this University. His words were as follows:

“I thank you for your loyal and dutiful address and for your sympathy with the grief of myself and my family for the death of my beloved mother.

“The progress of your University, from its commencement almost at the date of her late Majesty's accession to its recent reorganisation as a teaching as well as an examining body, has been one of the most remarkable developments witnessed in a reign memorable for the spread of higher instruction among both sexes and all classes and races in my Empire.

“You may feel assured of my hearty sympathy and good wishes and cooperation in the furtherance of your good work.”

“It will be in the recollection of many of you that, exactly a year ago to-day, it was the speaker of these words who, as Prince of Wales, sat on the right hand of this chair and spoke words of hope and good augury for the future upon our recent occupation of this newer and larger abode.

“But it is not only the death of the Queen that we have to regret. A most serious illness has, during the last few months—months of critical import for the University—made it impossible for our Chancellor to take any part in our work. He has, you will all be glad to hear, made a marvellous recovery, and he

has sent me a letter to read to you from which you will see the deep interest he continues to take in all our affairs. It will be no small pleasure to him to think that, in his absence, we have as our guest his old colleague and friend, Lord Rosebery.

"It has been the lot of our Chancellor for many years past to speak with hope deferred of the creation of a great teaching University in and for the metropolis. This year, if it is not exactly in my power to say that the reconstitution and re-organisation have been completed, yet this one can say, that it will be chiefly ourselves whom we shall have to blame—I mean the teachers, the schools, and even the senate of this University—if a great centre of learning and research does not grow up in London.

"For although, ladies and gentlemen, the old work of the University will be continued in the future as it has been in the past—even, I may hope, with increased prosperity—although the examination of all candidates, no matter what their origin or their means of knowledge, will continue with that absolute fairness and impartiality upon which the University has built up so great a reputation, yet we must not deceive ourselves. The most perfect examination system conceivable can only, to quote the words of the reply from the throne, add to the 'higher instruction' of a nation. But this is not enough. If we are to meet successfully the constant changes of thought and manner of life to which a highly organised society is increasingly liable, our Universities must not be content with giving instruction or testing attainment, however high, but must make real contribution to the knowledge which alone in some form or other will be a guarantee of the stability of that society. Unless the University of London is known as a centre from which almost daily additions to our understanding of the world of thought and matter emanate, we shall not have justified our existence.

"But, ladies and gentlemen, how is this end to be attained? Such results cannot come from a few weeks' work, or without the expenditure of much energy and money. In the first instance it should be our object to reduce to a minimum the wastage of our forces by overlapping and friction between the various elements of the University already existing. The need for concentration in preliminary medical studies is one of the most urgent of these early steps, not merely—not even chiefly—because it is a waste to have the work in these junior departments spread over London with frequently inefficient or duplicated equipment, but largely because the relief that would come to the medical schools by concentrating these studies in two or three central institutions would place at the disposal of the authorities opportunities and space badly needed for conducting research in pathology, bacteriology and the other higher branches of medical and surgical science.

"Such a concentration, as has been suggested in the case of the Medical Faculty, will doubtless lead to difficult problems which will require, and, I am sure, will receive, the whole-hearted cooperation of the various schools and teaching institutions of the University for their successful solution.

"It will not be necessary, I hope, to remind you that it will be ultimately impossible for each school of the University to fulfil within its four walls all the functions that belong to a university such as we conceive it to be at the present day. There are parts of London in which certain kinds of study can be much more profitably pursued than in others. It would be foolish, for instance, to attempt to centralise the study of ancient literature and archaeology in Surrey or even in South Kensington, whereas we have materials around us here without parallel for the study of natural history, or of the history of modern art, to say nothing of pure and applied science. As opportunity arises for the better equipment of this or that branch of learning, it should be our aim to inquire in what part of London this equipment can be placed so as best to make use of facilities already existing and so as best to attract the largest possible number of good students. If this be our policy, our University will in course of years become an Imperial University in an altogether new and fuller sense, and the reputation that it will win for itself in the world of thought will bring it those more solid rewards without the aid of which its successful working will be seriously endangered.

"But without the schools of the University we can do nothing, and I venture to take this, the first, opportunity of calling upon them here—to-day—to take their share in this movement and to believe that the best hope of success for each member

of the body corporate will be found in the prosperity of the whole."

Lord Rosebery said, in the course of his remarks, "In my judgment the struggle of this coming century will not be so much one of brute force as of trained intelligence. In the diplomacy of the world, in the markets of the world, in your arrangements of legislation and of government, it will be intelligence that will win. There was a time, I do not doubt, not so long ago, when the nations of the world were satisfied with a very moderate degree of instruction and intelligence. The schoolmaster, we are told, was abroad—I think it was said by Lord Brougham and probably in this University—and he has been so much abroad that no nations are satisfied with the standard of education that prevailed 25 years ago. Every nation demands a more keen and more trained and, if I may use the adjective, a more versatile intelligence than that which was adequate for the business methods of the Empire in former days. In other words, we have to meet much keener competition in every department of life. I hope, though perhaps not with much confidence, that all our educational institutions in this country are recognising that fact, or are about to, and are preparing to furnish up their somewhat antiquated methods in some cases to meet the demands of modern civilisation and modern competition. That is what this University has done, and is doing; and that is why I am so happy to be here to-day and to give my modest and unasked for benediction to these proceedings."

Sir Michael Foster held that there must be in London a University devoted, not only to the spreading of knowledge, but also to the making of knowledge.

Lord Reay said that London could offer facilities for research in every domain second to none in the civilised world. They might look forward to an increasing number of students from every part of the Empire to make use of those resources. Modern requirements were constantly growing, and they could not cope with the demands made on them without the exercise of public spirit which was so brilliant in the United States of America.

THE LANGUAGE AND ORIGIN OF THE BASQUES.

THE Basques or Euskaldunak (*i.e.* "the Men"), as they call themselves, are a most remarkable people who have long been an interesting problem to ethnologists. The most anomalous point about the Basques is their language, which is as typically agglutinative as any Asiatic or American tongue. Ripley, in his fine book "The Races of Europe," points out that the verb habitually includes all pronouns, adverbs and other allied parts of speech; as an example of the appalling complexity possible as a result, Bladé gives fifty forms in the third person singular of the present indicative of the regular verb "to give" alone. Another often quoted example of the effect of such agglutination occurs in a reputed Basque word meaning "the lower field of the high hill of Azpicuelta," which runs,

Azpícuclagaraycosaroyarenberecolarraea.

No wonder that the French peasants state that the devil studied the Basque language for seven years and learned only two words. Like many other undeveloped languages, the principle of abstraction or generalisation is but slightly developed; for example, as there is no general word for "sister" the Basques have to say "sister of the man" or "sister of the woman," &c. Owing to their isolation on both flanks of the Pyrenees, many primitive institutions persist among the Basques. In some places the eldest daughter takes precedence over all the sons in inheritance, which may be a relic of a former matriarchal family; communal ownership within the family is frequently practised. The remarkable custom now known as the *couvade*, in which the father takes to his bed on the birth of a child, was attributed to these people by Strabo, and it is believed by some not to have completely died out at the present day, though there is great difficulty in proving its existence, as G. Buschan points out in *Globus* (Bd. lxxix. p. 117). H. Schuchardt has recently (*Globus*, Bd. lxxix. p. 208) expressed his wonder that this statement has again been dragged from the realm of